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# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

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June 1, 1992

TO: Minerals File

FROM: Holland Shepherd, Senior Reclamation Specialist *HS*

RE: Inspection Environmental Remediation Sites, Bingham Pit, Kennecott  
Utah Copper, M/035/002, Salt Lake County, Utah

Date of Inspection: May 28, 1992

Time of Inspection: 9:00 a.m. - 2:00 p.m.

Conditions: Sunny and warm

Participants: Fred Fox, Don Deines, Rod Davies, Len Marrs, Bart VanDyken,  
and Paul Rokich, Kennecott; Lowell Braxton, Wayne Hedberg, and  
Holland Shepherd, DOGM

The purpose of this inspection was to evaluate areas now being used by Kennecott as part of a massive environmental remediation project. The sites involve areas associated with the operation's acid dump leach system and a series of old, pre-law waste dumps and tailings disposal areas. The sites have been identified by EPA as candidates for CERCLA listing and are being evaluated under the CERCLA process. Under an EPA Administrative Order on Consent, the operator has agreed to clean up the sites.

The operator is currently involved in remediating three major areas: 1. the Bingham Reservoir, 2. the acid leach dumps and associated leachate collection system, 3. the Butterfield Canyon waste dumps and acid mine discharge. Other areas have been identified by the operator for clean-up. These projects will be ongoing throughout the summer and fall. It is anticipated that the overall work will not be completed for 2 to 3 years. A map of those areas affected has been attached to this memo.

Our first stop was at the large Bingham Reservoir. The operator is in the process of draining the reservoir (nearly complete) and is now removing the sediments from it. The sediments contain metals, sulfates and low pH which have

caused a documented groundwater hazard. The sediments are composed of @4 feet of original topsoil, @6-8 feet of copper tailings deposited at the turn of the century, and @6-8 feet of sludge generated from the more recent acid dump leach process and storm water runoff. An estimated 2,000,000 cubic yards of sediment (sludge and tailings) will be removed from the reservoir.

The sediments are being taken to the 5960 and 5816 dumps for disposal. The benches and faces of these dumps are being used for application of the Bingham sediments. These dumps were used at one time for acid leaching, hence the leach dump material has become highly acidic. Leaching has permanently ceased on these dumps. The dumps are to act as a repository for the sediments.

Reservoir sediments are being mixed with lime and carbonate based alluvium to increase the pH of the sediments. The sediments will be spread to a depth of 6 inches to 1 foot on top of the waste rock material. The dump faces are being regraded to slopes of 3:1. After grading and sediment deposition, the dumps will be revegetated.

The operator has constructed 31 small test plots to evaluate the best seed mix and amendments to use on the Bingham sediments and leached waste rock. Revegetating this material may prove to be difficult because of the nature of the material being used as a planting medium (this includes both the dump material and the reservoir sediments). It will be necessary to obtain successful revegetation of the dumps to stabilize the sediments and reduce leachate formation.

Another portion of the inspection involved a review of the construction of the new East Side Leachate Collection System. This system will collect leachates from the acid leach dumps, more efficiently, directing it to the processing facilities and the process ponds. The operator is installing a series of cut-off wall collection structures at various locations from north to south along the foot of the dumps. The cut-off walls, constructed of concrete are anchored/keyed into bedrock at drainage locations where the leachate will concentrate. Leachate is then channeled via plastic HDPE piping and concrete lined ditches to the process facilities.

The leachate collection system is being upgraded to retain more of the leachates generated by the Bingham Canyon Mine dump leaching system. In Kennecott Utah Copper's Environmental Response summary, dated April 11, 1991, the acid dump leaching system is listed as contributing to the degraded groundwater plume extending away from the Bingham Reservoir and dump leach facilities.

Because the leach dumps were never lined, the remedial action being taken by Kennecott is the next best approach to remediation of the leachate generation problem. It is suspected, though yet unproven, that leachate could still be escaping beneath the dumps, via fractures in the volcanic rock. The Division of Water Quality has asked Kennecott to obtain a Groundwater Discharge permit for this particular portion of the mine. The permit will address the question of leachate escape beneath the heaps.

Our tour of the site also involved an inspection of the remediation work being performed at the Butterfield Canyon site. The operator is removing 800,000 cubic yards of pre-law generated waste material to an area entitled the Castro dump. Old waste dumps have already been removed from hillsides along Butterfield Canyon Creek. The remaining areas have been re-contoured and will be reseeded.

Our last official stop on the inspection was a visit to a section of the Magna tailings facility entitled the Step Back Dam. Approximately 180 acres of tailings pond were reclaimed last spring and fall. The operator, via the efforts of Mr. Paul Rokich, has generated a healthy stand of rye and re-green over the site. The tailings are still somewhat soft, due to moisture content, so presented a challenge to the operator to revegetate. Some small portions had to go unseeded (seeded with drill seeder) because of the boggy nature of the tailings. It is extremely important to vegetate the areas of dried tailings as a means of reducing wind erosion and dust production. Northeast Magna is within two miles of this portion of the tailings pond. In active portions of the pond, the upgraded water/tailings spreading system acts to alleviate dust problems.

Mr. Rokich indicated that salts and acids in the tailings are major hurdles to overcome regarding plant establishment. Mr. Rokich selects species that are salt and acid tolerant. Other than a drip irrigation system for the trees, Kennecott utilizes no other soil amending process to achieve plant establishment.

Pictures taken during this inspection will be made available to the file.

#### **Recommendations:**

Regarding the sites included under the Work Plan of the Order on Consent, Kennecott has asked the Division to exclude areas from bonding and

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permitting which will not be used for ongoing operations. For example, once the Butterfield canyon clean-up is finished it will not be used further. On the other hand the Leachate Collection System will be used indefinitely. My recommendation is that pre-law remediation sites being impacted as part of a one time clean up project, be excluded from the permitting process. Areas such as the Leachate Collection System and the Bingham Reservoir clean-up sites should be permitted, since they are part of a post-law area and have an on-going utility. The Division needs to make a decision regarding supplemental permitting and bonding, then send a formal letter to Kennecott expressing our decision.

Revegetating the old acid leach dumps may prove to be difficult. I recommend that the Division monitor the progress on the test plots closely. I also recommend that the Division obtain information regarding the soils characterization for the materials being used for reclamation. Long term stabilization and decommissioning of the leach dumps may be a factor in whatever reclamation agreements are to be made between the operator and Division. We may not be able to address these questions until after the operator has obtained a groundwater discharge permit from DEQ.

jb

Attachment

cc: Fred Fox, Kennecott Utah Copper  
Minerals Staff and Lowell Braxton (route)  
M035002



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KENNECOTT  
PROPERTY  
BOUNDARY

NEW STORMWATER  
RESERVOIR

COOPER TON

BLUWATER 1  
REPOSITORY

KENNECOTT  
PROPERTY  
BOUNDARY

PROPOSED  
HAUL ROAD

CRAPO  
REPOSITORY  
SEE DWG.  
#451-T-966

LARK MINE WASTE ROCK  
& COLLECTION PIPELINE  
SEE DWG. #451-T-966

EAST SIDE COLLECTION  
CANAL & ACCESS ROAD  
SEE DWG. #451-T-965

PROPOSED HAUL ROAD  
& COLLECTION PIPELINE

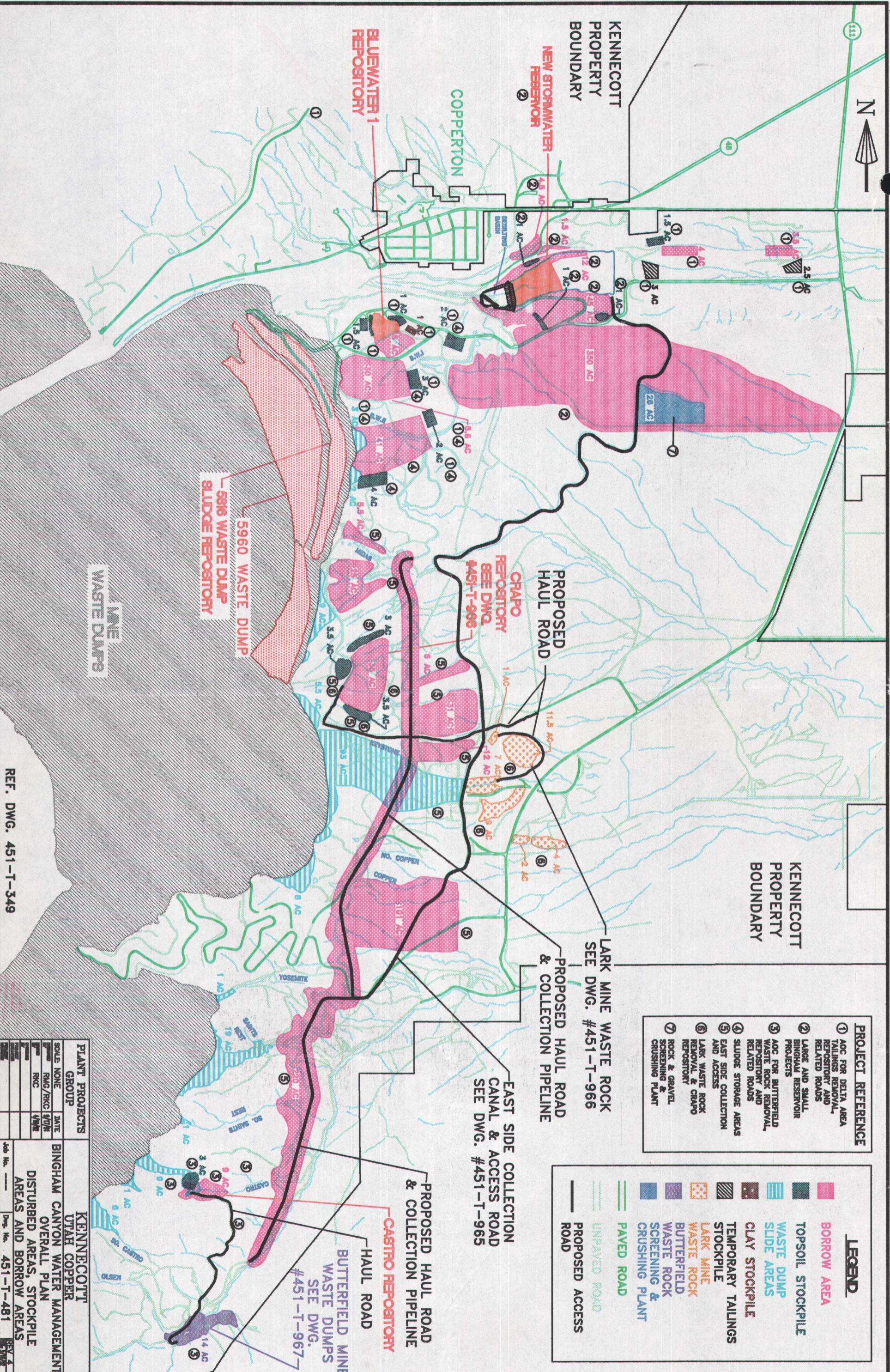
BUTTERFIELD MINE  
WASTE DUMPS  
SEE DWG.  
#451-T-967

5960 WASTE DUMP  
SLUDGE REPOSITORY

WASTE DUMPS

- PROJECT REFERENCE**
- ① AOC FOR DELTA AREA TAILINGS REMOVAL, REPOSITORY AND RELATED ROADS
  - ② LARGE AND SMALL BINGHAM RESERVOIR PROJECTS
  - ③ AOC FOR BUTTERFIELD WASTE ROCK REMOVAL, REPOSITORY AND RELATED ROADS
  - ④ SLUDGE STORAGE AREAS
  - ⑤ EAST SIDE COLLECTION AND ACCESS
  - ⑥ LARK WASTE ROCK REMOVAL & CRAPO REPOSITORY
  - ⑦ ROCK & GRAVEL SCREENING & CRUSHING PLANT

- LEGEND**
- BORROW AREA
  - TOPSOIL STOCKPILE
  - WASTE DUMP
  - SLIDE AREAS
  - CLAY STOCKPILE
  - TEMPORARY TAILINGS STOCKPILE
  - LARK MINE WASTE ROCK
  - BUTTERFIELD WASTE ROCK
  - SCREENING & CRUSHING PLANT
  - PAVED ROAD
  - UNPAVED ROAD
  - PROPOSED ACCESS ROAD



REF. DWG. 451-T-349

PLANT PROJECTS		KENNECOTT UTAH COPPER	
GROUP	DATE	BINGHAM CANYON WATER MANAGEMENT	
SCALE NONE		OVERALL PLAN	
RMC/RKC	9/0/01	DISTURBED AREAS, STOCKPILE	
RKC	4/0/02	AREAS AND BORROW AREAS	
Job No.		Dwg. No.	451-T-481